

## Evaluation of rehabilitated forest stands development using hemispheric photograph

### ABSTRACT

Most tropical rainforest tree species depends on forest gaps for their successful regeneration. Evaluation on the gap or canopy openness provides an indicator on the forest development stages. This paper reported on the canopy openness (CO) of three study plots at (1-, 9-, 18-year old) rehabilitated forest sites and one study plot at natural regenerating secondary forest ( $\pm$  22-year old) in UPM-Mitsubishi Corporation Forest Rehabilitation Project, Universiti Putra Malaysia Bintulu Sarawak Campus (UPMKB). Plot of 20 x 20 m was established where dendrometric parameters were collected while Delta-T Device HemiView system was used to take the hemispherical photograph and field observation information were used to assess the CO. Qualitative analysis of the photographs suggested there were three stages of forest growth namely gap, building and mature stand development phases. These also helped the interpretation of the quantitative analysis in relation to forest dynamics. Hemispherical photographs were used for quantitative analysis of the CO. CO showed statistical significant differences among study plots which recorded a range of 3-78%. Rapid analysis of CO on the hemispherical photographs with information from the dendrometric measurement had assisted in assessing the forest stand development. The canopy openness was dependent on the age of the rehabilitated forest. Overall, the study plots were in the different stages of stand development.

**Keyword:** Canopy openness; Hemispherical photograph; Natural regenerating secondary forest; Rehabilitated forest